REMARKS

Claims 1-27 and 30-32 are pending in the present Application. No claims have been cancelled, amended, or added, leaving Claims 1-27, and 30-32 for consideration. Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

Claim Objections

Claims 19 and 23 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants respectfully traverse this objection. Both Claim 19 and Claim 23 require that *the* support member comprise *the* first electrode. In other words, the first electrode is part of the support member, while in the independent claim from which these claims depend, the first electrode could be a separate element from the support member (e.g., not part of the support member). Hence, these claims do further limit the claims from which they depend. Reconsideration and withdrawal of this objection are respectfully requested.

Claim Rejections Under 35 U.S.C. §102(b)

Claims 1 – 7, 10, 13 – 15, 17, 18, 20 – 22, and 24 – 27 stand rejected under 35 U.S.C. §102(b), as allegedly anticipated by U.S. Patent No. 5,372,689 to Carlson et al. Applicants respectfully traverse this rejection.

Carlson et al. teach an ion exchange membrane supported by a single porous sheet disposed between the anode and a screen set. Carlson et al. disclose a "porous sheet 14 is perforated having multiple-pore sizes". (Col. 3, lines 48 – 50) However, Carlson et al. fail to teach multiple porosities.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

Applicants' independent claims disclose a porous support member comprising a first portion and a second portion wherein the porosity of the first portion differs from the porosity of the second portion.

Carlson et al. do not teach a porous support member comprising a first portion and second portion of differing porosities. Contrary to the Office Action, Carlson et al. focus on pore size, not porosity. Disclosure of multiple-pore sizes is not a disclosure of different portions with different porosities. Carlson et al. are interested in dual-directional flow of oxygen or hydrogen and water. They discuss porosity in relation to the whole porous sheet. (Col. 4, lines 1 – 30) In reply to this explanation, the Examiner contends that

> Carlson teaches that the porous support member have multiple pore sizes. One of ordinary skill in the art would have realizes [*sic*] that pore size affects porosity. Assuming the same pore spacing larger pore results in higher porosity. Therefore, multiple pores sizes in the porous support member of Carlson leads to multiple portions of the porous support member having different porosities.

(Office Action dated March 7, 2006, hereinafter "OA 03/06", page 15) Applicants respectfully disagree that Carlson teaches "multiple portions... having different porosities" or that the support member of Carlson would lead to "multiple portions... having different porosities". The Examiner's assumption, as stated, does not lead to a support member of different porosities if pores of the same size are not grouped together. As explained previously, Carlson et al. are interested in dual-directional flow of oxygen or hydrogen and water. (Col. 3, line 60 – Col. 4, line 9) From this description, it appears that the multiple size pores are distributed throughout the sheet to enable the desired flow. If there were portions having the same size pores (as suggested by the Examiner), it is not understood how the desired flow would be attained. The multiple pore sizes are present to attain simultaneous flow of different substances. Hence, there is no sound basis in technical reasoning to reach the conclusions set forth in OA 03/06. Actually, the conclusion would seem contrary to Carlson et al. as a whole.

In order to support an anticipation rejection based on inherency, an Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990); In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). When relying on the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art. In the present case, the Examiner has explained that multiple pore sizes are present in the sheet of Carlson et al., but has failed to

provide a basis in fact and/or technical reasoning to reasonably support the determination that the porous sheet of Carlson et al. has portions having different porosities. Inherency has not been established, and the alleged inherency appears contrary to the teachings of Carlson et al. as a whole.

Regarding the dependent claims, the limitation of the support member being sintered is an article limitation since a sintered layer is different than a non-sintered layer. The Examiner contends that "a porous support member can be made by a different process such as a process that does not involve sintering...". (OA 03/06) Applicants do not deny that there are several ways that sheets can be formed. However, if these techniques do not process the sheet such that a sintered sheet is produced, the sheet is not covered by the claims.

For at least these reasons, Carlson et al. fail to anticipate Applicants' claims. Applicants respectfully request reconsideration and withdrawal of this rejection.

Claim Rejections Under 35 U.S.C. § 102(e)

Claims 1-5, 8, 15, 17, 18, and 31 stand rejected under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent Publication No. 2002/0086195 A1 to Gorman et al. Claim 20 stands rejected under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent Publication No. 2003/0230495 A1 to Anderson et al. Applicants respectfully traverse these rejections.

Gorman et al. teach a PEM fuel cell wherein catalyst layers are disposed on both sides of a proton exchange membrane. Bilayer porous plates are positioned adjacent the catalyst layers. Water transport plates (WTP) are positioned adjacent the porous plates that "provide a full planar surface to the bilayer plate and the WTP acts as a water source that may be augmented by inlet stream water saturation up to about 100% relative humidity" [0011]. The Examiner admits that Gorman fails to teach a sintered porous plate as taught and claimed in the present application.

Anderson et al. teach an electrolysis system and a method of operating the system wherein the system comprises a gravity fed water system employing a non-continuous water supply. Here, the Examiner refers to a porous flow field member (Figure 4, #74 and #84). (OA 03/06, pages 6 – 7). However, Anderson et al. refer to elements 74 and 84 as oxygen flow field structure and hydrogen flow field structure, respectively, and not "porous flow field member".

Additionally, Anderson et al., as with Gorman et al., do not mention that this member is a sintered support member.

Merely for informational purposes and as evidence that "sintered" does provide a structural limitation, enclosed with the present response is an exemplary explanation of "sintered" from Schlumberger (http://www.glossary.oilfield.slb.com/Display.cfm?Term=sintered). Here, in one technical field, e.g., oilfield, sintered is described in relation to a filter as "pertaining to a *type* of filter medium...". As Applicants have explained in the present case, "sintered" describes the type of porous support member.

Claim 20 claims "a flow field consisting essentially of a sintered porous support member". Neither Neither Gorman et al. nor Anderson et al. teach a sintered porous support member, and are therefore at least missing that element of Claim 20. Since to anticipate a claim, a reference must disclose each and every element of the claim, Gorman et al. and Anderson et al. fail to anticipate the present claim. Applicants respectfully request reconsideration and withdrawal of these rejections.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 16, 19, and 23 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 5,372,689 to Carlson et al. Applicants respectfully traverse this rejection.

As explained above, Carlson et al. fail to teach all of the elements of the independent claims (e.g., Claims 1 and 20), and for at least this reason, fail to render the claims obvious.

Furthermore, it is alleged that

> Even though Carlson does not explicitly teach that the support members comprise the first and second electrodes, one of ordinary skill in the art would have found the integration of the support members and the electrodes of Carlson obvious since it is well settled that the use of a one piece construction instead of the structure disclosed in Carlson would be merely a matter of obvious engineering choice.

(OA 03/06, page 7)

Applicants note that obviousness is not based upon what an artisan could do or what an artisan may try, but is based upon what an artisan would be motivated to do with an expectation

of success. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, No. 04-1616 (CAFC March 22, 2006) citing *In re Lee*, 277 F.3d 1338, 1343-46 (Fed. Cir. 2002); and *In re Rouffett*, 149 F.3d 1350, 1355-59 (Fed. Cir. 1998). "When the [Examiner] does not explain the motivation, or the suggestion or teaching, that would have led the skilled artisan at the time of the invention to the claimed combination as a whole, [it is] infer[ed] that the [Examiner] used hindsight to conclude that the invention was obvious." *Id.*

Here, the Examiner relies upon a merely conclusory statement, e.g., that "it is well settled that the use of a one piece construction instead of the structure disclosed in Carlson would be merely a matter of obvious engineering choice", to allegedly attain the claimed invention. There is no teaching, suggestion, or motivation to combine the electrode(s) with the porous support member(s), and there is no expectation of success. There is no explanation of how such combination would, could, or might affect the operation of the electrode and/or its interaction with the membrane. The present application is not the mere combination of two mechanical components into a single component as suggested in the conclusory statement. The interaction of the components and the ability to function as intended, e.g., the chemical reactions on the electrode and the interaction with the membrane, are also factors. No motivation (besides a merely conclusory statement) and no expectation of success have been provided. Since the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art, i.e., that the prior art relied upon must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references, and that the proposed modification of the prior art must have had a reasonable expectation of success, and since that burden has not been met, no *prima facie* case of obviousness has been established. Reconsideration and withdrawal of these rejections are respectfully requested.

Claim 9 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Carlson et al. in view of U.S. Patent No. 6,365,032 B1 to Shiepe et al, and as allegedly unpatentable over Carlson et al. in view of U.S. Patent Publication No. 2004/0183055 A1 to Chartier et al. Additionally, Claims 11, 12, and 30 stand rejected under 35 U.S.C. §103(a), as allegedly

unpatentable over Carlson et al. in view of U.S. Patent No. 6,666,961 B1 to Skoczylas et al. Applicants respectfully traverse these rejections.

It is first noted that, as dependent claims from patentable independent claims (as discussed above), these claims are, by definition, allowable.

It is admitted in the OA 03/06 that Carlson et al. fail to teach the single layer porous support member with a porosity gradient. Therefore, Shiepe et al. are relied upon to allegedly teach the use of a pressure pad having a porosity gradient, while Chartier et al. are relied upon to teach "a porous layer material having a control porosity gradient which can be used in electrodes in and electrochemical cell". (OA 03/06, page 8)

Section 103 sets out the test for obviousness determinations. It states, in pertinent part, that such determinations are to be made by consideration of

> . . . the differences between subject matter sought to be patented and the prior art such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the [pertinent] art.

In making a Section 103 rejection, the Examiner bears the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1998). The Examiner ". . . can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in art would lead that individual to combine the relevant teachings of the references". *Id.*

As explained above, Carlson et al., when read as a whole, teach dual-directional flow of oxygen or hydrogen and water. (Col. 3, line 60 – Col. 4, line 9) From this description, it appears that the multiple size pores are distributed throughout the sheet to enable the desired flow. The Examiner has failed to explain how Carlson et al.'s intended function would be achieved if the sheet were replaced with the sheet of Shiepe et al.; i.e., how a porous support member with a porosity gradient would attain the dual-directional flow. Hence, in arriving at this specific construction, the Examiner seems to have destroyed the intent of Carlson et al. In this regard, the courts have held that "[i]f the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon* 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Additionally, with respect to Chartier et al., this reference is discussing "dense solid-state electrolyte and electrodes... SOFCs (solid oxide fuel cells)..." (Paragraph [0019 – 0024]), while

Carlson et al. are directed to an ion exchange membrane that they are supporting with the porous sheet (Col. 3, lines 60 – 68). These are two different types of electrochemical cells with different properties and different designs. There is no motivation for an artisan to consider a design of a solid-state electrolyte in Chartier et al. as a replacement for a porous sheet of Carlson et al. Applicants maintain that the Examiner has used an improper standard in arriving at this rejection, based on improper hindsight, which fails to consider the totality of the cited references. More specifically the Examiner has used Applicants' disclosure to select portions of the cited references to allegedly arrive at Applicants' invention. In doing so, the Examiner has failed to consider the teachings of the references as a whole in contravention of section 103. There is no motivation or expectation of success to combine Carlson et al. with Chartier et al. as suggested in OA 03/06. No *prima facie* case of obviousness has been established.

It is also admitted in OA 03/06 that Carlson et al. fail to teach the claimed channel patterns. (page 9) Therefore, Skoczylas et al. are relied upon to allegedly teach flow fields with grooves and other flow features. (*Id.*) Allegedly, "one of ordinary skill in the art would have found it obvious to have incorporated the grooves and/or flow features into the porous support member of Carlson in order to form an appropriate flow field for various fluids as taught by Skoczylas..." (*Id.*)

Again, as noted above, Carlson et al. teach a particular porous sheet to attain a particular function. There is no teaching, suggestion, or motivation that modification of Carlson et al. as suggested in OA 03/06 would retain Carlson et al.'s desired function. Additionally, Claims 11, 12, and 30 claim specific channels. There is no teaching in these references of the specific claimed channels (such as "the channel extends from an inlet disposed proximate an edge of the side to a terminus disposed proximate a geometric center of the side", "the channel extends from an inlet disposed proximate an edge of the side to an outlet disposed proximate the same or a different edge of the side", or "the channel is disposed between the first portion and the second portion").

Finally, Skoczylas et al. do not state that "various types of grooves and flow fields are functionally equivalent" as is stated in OA 03/06. (page 9) Merely stating that flow fields of electrochemical cells can comprise various elements does not state that the elements are equivalents. Artisans understand that a list of potential components is just that, a list; it does not

establish equivalents. The elements of the list may actually include elements that function well under some conditions and not other conditions, elements that are preferred and that are not preferred, and even elements that do not work well to perform the function.

There is no motivation to combine Carlson et al. with Skoczylas et al. as suggested in OA 03/06, and no expectation of success; no *prima facie* case of obviousness has been established. Additionally, even combined, there is no teaching of the specific claimed channels. Hence, Carlson et al., in view of Skoczylas et al., fail to render the claims obvious.

For at least these reasons, reconsideration and withdrawal of these rejections are respectfully requested.

Claims 6, 9, 16, and 19 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gorman et al.; Claims 10-12, and 30 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gorman et al. in view of Skoczylas et al.; Claim 13 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gorman et al. in view of Carlson et al.; Claims 14, 20-25, 27, and 32 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gorman et al. in view of Shiepe et al.; and Claim 26 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gorman et al. in view of Shiepe et al., further in view of Skoczylas et al. Applicants respectfully traverse these rejections.

As explained above, the independent claims are patentable over Gorman et al., and at least for those reasons, the dependent claims are therefore patentable over Gorman et al.

Regarding Skoczylas et al., as explained in detail above, Skoczylas et al. fail to teach the specific claimed channels and fail to state that all flow fields and flow features are equivalents. Additionally, Skoczylas et al. fail to provide motivation to modify Gorman et al. as suggested in OA 03/06. The alleged motivation to combine the references is based upon the incorrect contention that Skoczylas et al. teach that the elements are equivalents. Since Skoczylas et al. do not teach that they are equivalents, no valid motivation to combine has been provided. Hence, no *prima facie* case of obviousness has been established.

Regarding Carlson et al., it is relied upon to allegedly teach portions with different porosities. (OA 03/06) However, as explained in detail above with respect to Carlson et al., they

do not teach portions with different porosities. Therefore, this combination fails to solve the admitted deficiencies of Gorman et al., and the combination fails to render the claims obvious.

Shiepe et al. are relied upon to allegedly teach a particular pressure pad, and hence it would allegedly be obvious to incorporate the pressure pad of Shiepe et al. into the apparatus of Gorman et al. (OA 03/06, page 13) However, Gorman et al. are discussed in relation to their water transport plate (OA 03/06, pages 5 – 6). Gorman et al.'s water transport plate comprises a particular design for a particular purpose. The Examiner has failed to explain why an artisan would be motivated to replace the water transport plate of Gorman et al. with the sheet of Shiepe et al. As noted above, obviousness is not established on what an artisan could do or may try, but is based upon what an artisan would be motivated to do, with an expectation of success, at the time of the present invention. Here, there is no motivation to replace the water transport plate of Gorman et al. with the pressure pad of Shiepe et al., there is no expectation that the pressure pad would function in the same manner as the water transport plate of Gorman et al., and there is also no motivation to just add another component to Gorman et al., e.g., to add the pressure pad of Shiepe et al. There is no motivation to add components and increase cost. No *prima facie* case of obviousness has been established.

Finally, regarding the combination of Gorman et al. with Shiepe, and further with Skoczylas et al., this combination does not solve any of the above describe deficiencies. Additionally, there is no motivation or expectation of success to start picking pieces out of the various references to modify Gorman et al. to try to attain the present claims. The relevant test is what an artisan would be motivated to do with an expectation of success. It is not relevant if an artisan could or might try a combination. Here there is no motivation to pick and choose, no expectation of success, and no reason to believe that even if an artisan picked and chose from these references, s/he would arrive at the claimed invention. No *prima facie* case of obviousness has been established.

For at least the reasons set forth above, no *prima facie* case of obviousness has been established. The present claims are non-obvious in view of the combinations suggested in OA 03/06. Reconsideration and withdrawal of these rejections are respectfully requested.

It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the objections and rejections and allowance of the case are respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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